CLAIMS

1. A membrane-electrode structure comprising a pair of electrodes that comprise catalyst layers, and a solid polymer electrolyte membrane sandwiched by said catalyst layers of both electrodes, characterized in that:

said catalyst layers are positioned in the inner circumference side than the outer circumferential edge of said solid polymer electrolyte membrane;

at least one face of said solid polymer electrolyte membrane is coated with said catalyst layers, and an adhesive support layer that is formed on said catalyst layers and throughout the entire circumference of the outer circumferential side of said catalyst layers, adheres to said solid polymer electrolyte membrane, and supports said solid polymer electrolyte membrane; and

said adhesive support layer is formed of an adhesive having fluorine atoms in the molecular structure.

2. The membrane-electrode structure according to claim 1, characterized in that said adhesive has a tensile elongation at break of 150% or more after curing.

3. The membrane-electrode structure according to claim 1, characterized in that said adhesive contains a polysiloxane compound and a molecule that has at least two alkenyl groups.

4. The membrane-electrode structure according to claim 1, characterized in comprising a diffusion layer that coats said catalyst layers and said adhesive support layer.

5. The membrane-electrode structure according to claim 4, characterized in that said diffusion layer is formed of a porous material, and said adhesive support layer is integrated with said diffusion layer through an adhesive-permeated layer formed by permeating said adhesive into said diffusion layer.

6. The membrane-electrode structure according to claim 5, characterized in that said adhesive-permeated layer is formed by permeating said adhesive into said diffusion layer in the region where said diffusion layer formed of a porous material coats said adhesive support layer, within a range wherein the filling factor to the void portion of said diffusion layer is 30 to 100%.

7. The membrane-electrode structure according to claim 1, characterized in that at least a part of the outer circumferential edge of said one catalyst layer is positioned on the portion different from the outer circumferential edge of the other catalyst layer, with sandwiching said solid polymer electrolyte membrane.

8. The membrane-electrode structure according to claim 7, characterized in that the outer circumferential edge of said one catalyst layer is positioned in the inner circumference side than the outer circumferential edge of the other catalyst layer, with sandwiching said solid polymer electrolyte membrane.

9. A polymer electrolyte fuel cell characterized in using a membrane-electrode structure comprising a pair of electrodes that comprise catalyst layers, and a solid polymer electrolyte

membrane sandwiched by said catalyst layers of both electrodes wherein:

said catalyst layers are positioned in the inner circumference side than the outer circumferential edge of said solid polymer electrolyte membrane;

at least one face of said solid polymer electrolyte membrane is coated with said catalyst layers and an adhesive support layer; and

said adhesive support layer is formed of an adhesive having fluorine atoms in the molecular structure, is formed throughout the entire circumference of the outer circumferential side of said catalyst layers, adheres to said solid polymer electrolyte membrane, and supports said solid polymer electrolyte membrane.

10. An electrical apparatus characterized in that using a polymer electrolyte fuel cell comprising a membrane-electrode structure comprising a pair of electrodes that comprise catalyst layers, and a solid polymer electrolyte membrane sandwiched by said catalyst layers of both electrodes wherein:

said catalyst layers are positioned in the inner circumference side than the outer circumferential edge of said solid polymer electrolyte membrane;

at least one face of said solid polymer electrolyte membrane is coated with said catalyst layers and an adhesive support layer; and

said adhesive support layer is formed of an adhesive having fluorine atoms in the molecular structure, is formed throughout

the entire circumference of the outer circumferential side of said catalyst layers, adheres to said solid polymer electrolyte membrane, and supports said solid polymer electrolyte membrane.

11. A transport apparatus characterized in using a polymer electrolyte fuel cell comprising a membrane-electrode structure comprising a pair of electrodes that comprise catalyst layers, and a solid polymer electrolyte membrane sandwiched by said catalyst layers of both electrodes wherein:

said catalyst layers are positioned in the inner circumference side than the outer circumferential edge of said solid polymer electrolyte membrane;

at least one face of said solid polymer electrolyte membrane is coated with said catalyst layers and an adhesive support layer; and

said adhesive support layer is formed of an adhesive having fluorine atoms in the molecular structure, is formed throughout the entire circumference of the outer circumferential side of said catalyst layers, adheres to said solid polymer electrolyte membrane, and supports said solid polymer electrolyte membrane.

12. A method for producing a membrane-electrode structure comprising a pair of electrodes that comprise catalyst layers, and a solid polymer electrolyte membrane sandwiched by said catalyst layers of both electrodes wherein:

said catalyst layers are positioned in the inner circumference side than the outer circumferential edge of said solid polymer electrolyte membrane;

at least one face of said solid polymer electrolyte membrane is coated with said catalyst layers and an adhesive support layer; and said adhesive support layer is formed throughout the entire circumference of the outer circumferential side of said catalyst layers, adheres to said solid polymer electrolyte membrane, and supports said solid polymer electrolyte membrane; characterized in comprising the steps of:

forming a solid polymer electrolyte membrane from a polymer electrolyte solutions;

forming irregularity having a maximum height R_{max} of surface roughness within a range between 3 and 20 μm on the area of said solid polymer electrolyte membrane coated by said adhesive support layer;

forming said adhesive support layer by applying an adhesive having fluorine atoms in the molecular structure onto a sheet backing, and drying; and

bonding said adhesive support layer formed on said sheet backing on the area where said irregularity of said solid polymer electrolyte membrane has been formed by pressing under heating.

13. The method for producing a membrane-electrode structure according to claim 12, characterized in that said adhesive

contains a polysiloxane compound and a molecule that has at least two alkenyl groups.